INSTRUCTION MANUAL

R2050OB

VIDEO MONITOR

Northern Electric

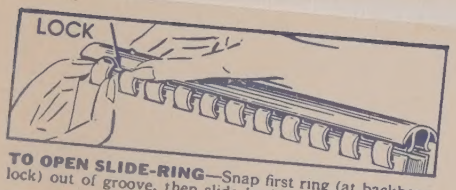
1940

INSTRUCTION MANUAL

R20500B

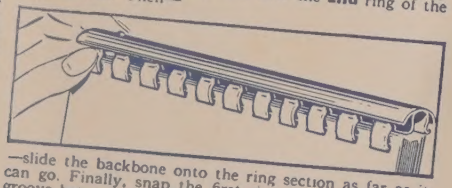
VIDEO MONITOR

PLASTIC SLIDE RING
DIRECTIONS FOR SHEET CHANGES



TO OPEN SLIDE-RING—Snap first ring (at backbone lock) out of groove, then slide backbone off.

TO LOCK SLIDE-RING—Engage groove of backbone (side opposite lock) with spine of ring section. Snap the other groove of backbone onto the **2nd** ring of the ring section. Then—



—slide the backbone onto the ring section as far as it can go. Finally, snap the first ring into the backbone groove between the lock and the end.

May 1964.

TABLE OF CONTENTS

CHAP.	SECTION	DESCRIPTION	PAGE
1.	1-01	General	1-01.1
	1-02	Specification	1-01.1
2.	2-01	Sub Assemblies	2-01.1
	2-02	Vacuum Tubes and Semiconductors	2-01.1
3.	3-01	Video Amplifier (V1A, V1B, V2A)	3-01.1
	3-02	Sync Chain	3-01.1
	3-03	Horizontal Deflection	3-01.2
	3-04	Vertical Deflection	3-01.2
	3-05	Brightness Control	3-01.3
4.	4-01	Installation General	4-01.1
	4-02	Power Connections	4-01.1
	4-03	Video and Sync Connections	4-01.1
	4-04	Access to Tubes and Circuitry	4-01.1
	4-05	Initial Adjustments	4-01.1
	4-06	Non Standard Sync	4-01.2
5.	5-01	Operation (Controls)	5-01.1
	5-02	Adjustment Procedures	5-01.1
	5-03	Non Standard Sync	5-01.3
6.	6-01	Maintenance (Adjustments)	6-01.1
	6-02	Pincushion Magnet Adjustments	6-01.2
	6-03	Replacement of C.R.T.	6-01.2
	6-04	Trouble Shooting Reference Information	6-01.3
	6-05	D.C. Voltage Table	6-01.3
7.	7-01	R20590 Rack Mounting Kit	7-01.1
8.	8-01	Parts List	8-01.1
9.	9-01	Drawings	9-01.1

Digitized by the Internet Archive
in 2025

https://archive.org/details/manualsplus_08212

LIST OF TABLES

NO.	TITLE	PAGE
2-01.1	Sub Assemblies	2-01.1
2-02.1	Vacuum Tubes	2-01.1
2-02.2	Semiconductors	2-01.1
5-01.1	Controls	5-01.1
6-01.1	D.C.Voltage Table	6-01.3
8-01.1	Parts List	8-01.1

LIST OF FIGURES

NO.	TITLE	PAGE
9-01.1	Schematic Diagram	9-01.1

CHAPTER I

GENERAL DESCRIPTION AND SPECIFICATIONS

1-01 General

1. The R20500B Video Monitor is a small compact, portable monitor featuring an 8" picture tube. It is readily carried and incorporates a handle on the top of the unit. The unit is designed to provide quality performance at an economical price.

2. All normal operating controls are accessible from the front. The ON-OFF/CONTRAST and BRIGHTNESS controls are operated by knobs, while the remaining controls are screw-driver adjustable. The front panel is easily removed by the means of four screws to clean the safety glass and picture tube face. The tubes and components are readily accessible by removal of the canopy covering.

3. The monitor will operate from either composite video, or non-composite signals by means of a changeover switch located at the rear of the instrument. Both inputs are located at the rear and are arranged for loop-through operation. Remote control for composite and non-composite operation can be added to the monitor, and a mounting arrangement for a relay has been provided. A red indicator lamp is visible from the front and can be used either as a Pilot or Tally light.

4. The monitor measures 8-1/2" x 8-3/4" x 14" deep and weighs 31 lbs. Two of these units can be mounted side by side in any standard 19" rack, occupying 10-1/2 inches of rack space. The necessary mounting components can be ordered separately in kit form.

1-02 Specifications

1. Electrical

Frequency Response:	(within 3 db) 50 cps to 6 mc/s
Composite Input Sensitivity:	0.35 volts peak to peak for full contrast picture.
Resolution:	Better than 600 lines.
Video Amplifier Gain:	48 db
High Voltage:	9.6 KV ±0.4 KV
Sync Input Sensitivity:	0.1 V to 8.0 volts

2. Mechanical

Depth:	14 inches.
Height:	8-3/4 inches.
Width:	8-1/2 inches.
Weight:	31 lbs.

CHAPTER 2

LIST OF COMPONENTS

2-01 Sub Assemblies

1. The following sub assemblies constitute the R20500B video Monitor.

TABLE 2-01.1

Video and Sync Chassis
Sweep Chassis
Back Chassis
8DP4 8" Cathode Ray Tube

2-02 Vacuum Tubes and Semiconductors

1. The following vacuum tubes are used in the R20500B Monitor and are part of it.

TABLE 2-02.1

Vacuum Tube Designation	Quantity	Function
6DJ8	1	1st and 2nd Video Amplifier
6DX8	1	Video Output/Sync Separator
6DX8	1	Sync Amp./Sync. Clipper
6CM7	1	Vertical Oscillator and Output
12AU7A	1	Horizontal Oscillator
6GB5	1	Horizontal Output
6AL3	1	Damper
1X2B	1	H.V. Rectifier
8DP4	1	8" Cathode Ray Tube

2. The following semiconductors are used in the R20500B Monitor and are part of it.

TABLE 2-02.2

Semiconductor Designation	Quantity	Function
1N478	2	D.C. Restorer
1RCD5	1	A.F.C. Control
1N547	2	Silicon Power Rectifier

CHAPTER 3

CIRCUIT DESCRIPTION

3-01 Video Amplifier (V1A, V1B, V2A). (See Schematic Diagram Fig. 9-01.1 for all references in this chapter)

1. The video amplifier consists of three stages of amplification, and is used in conjunction with a D.C. Restorer to give an overall gain of 48 DB.

2. The first stage is a grounded cathode triode amplifier (V1A), shunt peaked to obtain the necessary frequency response. The second stage (V1B) is a cathode follower. Composite video is coupled from the plate of this stage to the input of the sync amplifier (V3A)when the switch on the connector panel is in the "C" position.

3. The cathode resistor (R58) is the contrast control which feeds the video output stage. Proper bias is obtained by R11, which is connected from the grid to the cathode. A 100 ohm resistor (R68) is placed between the plate of the cathode follower and the plate dropping resistor. This is used to develop a signal of approximately the same amplitude as the composite input signal, and is fed to the grid of the first sync amplifier (V3A). This method allows composite sync signals to be obtained at a place other than the video input, thereby removing the input capacity of the sync amplifier from the video input.

4. The cathode follower feeds a pentode video output amplifier (V2A). The plate circuit uses a combination of shunt-series peaking (L2, L3) for high frequency compensation. The overall amplifier has sufficient gain such that the input signal can be attenuated 12 db (to 0.35Vp-p) and still obtain a full contrast picture with this reduced input voltage. The video output stage drives the grid of the C.R.T.

5. D.C. Restorer

(a) The D.C. component of the signal is reinserted at the output of the video amplifier by means of a D.C. Restorer. Two 1N478 diodes (CR3, CR5) are used in series to obtain the proper diode characteristics, and sufficient peak inverse voltage rating to handle excessive video output voltages which arise from misadjustment of the contrast control.

3-02 Sync Chain

1. The first sync amplifier (V3A) is a grounded cathode triode amplifier. The input to this amplifier is derived from the plate of V1B, when the signal selector is in the composite (C) position. In the non-composite (NC) position the signal is fed directly from the sync input connectors. The sync clipper (V3B) is a grounded cathode pentode stage which strips the video from the composite signal and passes only the sync information. The grid bias for the stage is derived by grid leak bias. The stage operates at a low plate and screen voltage to provide a small grid bias which cuts only a small portion off the sync pulse and amplifies it. All video information is below cut off.

2. The sync pulses are fed to the sync separator, a triode stage (V2 B), which also acts as a phase splitter. The positive and negative sync pulses are fed to the anode and cathode of the dual diode phase detector (CR4). A sawtooth comparison voltage from the AFC transformer (T4) - which is excited by the horizontal deflection current through the yoke (Y1) - is fed to the common lead of the dual diode. The correction voltage developed by the phase detector is fed into a filter network (C22, C23, R45) which removes most of the horizontal and vertical information. The output from the filter is fed to the grid of the horizontal multivibrator (V5A). From the plate of V2B the positive sync pulses are fed through an integrating network (N1)PC101, and then to the vertical oscillator.

3-03 Horizontal Deflection

1. The horizontal oscillator is a cathode-coupled multivibrator formed by V5A and V5B. To stabilize the frequency at line rate a horizontal stabilizing circuit formed by L5 and C24 is used. The horizontal hold control allows adjustment of the free-running frequency of the multivibrator.

2. The horizontal output stage is a beam power tube (V6) which drives into the horizontal output transformer to produce horizontal deflection. Horizontal size may be adjusted by R64 which is connected to the screen of the output tube. It may also be adjusted by a variable inductance (L6), width control, which is connected across terminals 7 and 6 of the horizontal output transformer.

3. A 100 ohm resistor (R54) is placed in series with the grid to prevent parasitic oscillations in the tube due to the hard cut-off and pulse characteristics.

4. The 56 ohm, 2W resistor (R52) is in the cathode to produce part of the bias, and also to prevent damage to the tube should the input fail and remove that source of bias. (Bias is also obtained through the input waveform driving the tube into grid conduction).

5. The actual deflection circuit consists of the horizontal output (flyback) transformer (T3), the damper tube (V7), the H.V. rectifier (V8) and the deflection yoke.

6. The B+ is supplied to the flyback transformer through the damper tube. This supply is fused at .25A (F2) to prevent damage in the event of excess current drain due to shorts. The damper tube is employed also to prevent ringing. The yoke windings are connected in series and compensated with an RC network to minimize ringing due to winding unbalance.

3-04 Vertical Deflection

1. The vertical oscillator amplifier (V4A, V4B) is a power multivibrator. The vertical hold control (R60) controls the free-running rate of the multivibrator by changing the fixed bias in the cathode of the first stage. The vertical size control (R61) changes the plate load of the first stage and so determines the pulse amplitude coupled to the grid of the second stage. The vertical linearity control (R62) in the cathode of the second stage determines the shape of the current sawtooth waveform through the vertical output transformer (T2). The output is coupled to the yoke through a stepdown transformer in order to develop sufficient current in the deflection yoke.

3-05 Brightness Control

1. The brightness control varies the positive bias on the CRT cathode to provide its cut-off voltage. The circuit is such that the tube can be driven hard into cut-off, or the raster can be viewed but cannot be adjusted to draw excessive beam current which would cause blooming and an excessive drop in ultor (final anode) voltage.

3-06 Power Supply

1. The monitor is powered from a 117 volt A.C. supply and uses an isolating transformer which also supplies the heater voltage. The transformer primary is fused with a 1.5A fuse (F1). Silicon diodes are used to achieve rectification.

CHAPTER 4

INSTALLATION

4-01 General

1. After the unit is unpacked it should be checked to insure it has not been damaged during shipment.

4-02 Power Connections

1. Connect the three conductor power cord which is supplied with the unit. This cord is provided with a three prong plug for use with the new NEMA universal receptacle. It provides a means of grounding the chassis and cabinet of the monitor as well as supplying power.

4-03 Video and Sync Connections

1. Either a composite or non-composite video signal source may be used. If a composite source is used place the sync selector switch located in the back of the monitor in the "C" position. Connect the signal to one of the two video input connectors located on the back of the monitor. Terminate the second connector with a 75 ohm terminating plug. If more than one monitor is to be fed from the same line, the 75 ohm termination is unplugged and the line "looped through" the first. The chain must be terminated by a 75 ohm termination.

2. When a non-composite signal is fed to the monitor, place the sync selector switch in the "NC" position. Connect the sync line to one of the two sync connectors, and terminate the second connector with a 75 ohm terminating plug. If more than one monitor is to be fed from the same line, the 75 ohm termination is unplugged and the line "looped through" the first. The sync chain is terminated by a 75 ohm termination.

4-04 Access to Tubes and Circuitry

1. Access to the tubes and circuitry may be gained by removing the canopy. This is accomplished by loosening the two 1/4 turn fasteners on the top of the monitor.

4-05 Initial Adjustments

1. Switch on the A.C. power and turn contrast control anti-clockwise.

2. Turn up the brightness control until a raster shows up on the screen. Back off the control approximately 15 degrees beyond the point where the raster is just extinguished.

3. Turn the contrast control clockwise until the desired normal contrast of the video information is viewed on the screen.

4. Screw Driver Adjustments

(a) If the picture "rolls" vertically upward or downward within the frame adjust the vertical hold for a stationary image.

(b) If the picture drifts horizontally adjust the horizontal hold for a stationary image.

(c) The horizontal width, focus, vertical linearity and vertical height controls are preset. For adjustment see Section 5-02, Adjustment Procedures.

4-04 Non Standard Sync

1. The unit can even set up to receive standard EIA sync in the composite mode.

2. If non standard sync is used in the composite mode, vertical instability may be exhibited.

3. To overcome this instability, trimmer (C39) should be adjusted.

CHAPTER 5

OPERATION

5-01 Controls

1. The following controls are located, from left to right, on the front panel. The brightness and contrast controls are knob adjustable, while the remaining controls are screw-driver adjustable through small holes.

TABLE 5-01.1

CONTRAST - ON/OFF	(R58)
VERTICAL HOLD	(R60)
VERTICAL LINEARITY	(R62)
VERTICAL HEIGHT	(R61)
HORIZONTAL HOLD	(R63)
HORIZONTAL WIDTH	(L6)
FOCUS	(R65)
BRIGHTNESS	(R59)

2. The following controls are located on the back chassis and are accessible when the canopy is removed.

(a) HORizontal STABility (L5)

(1) The horizontal stability coil (L5) is located in the upper left hand corner, and is used to remove the warp which appears on the vertical lines at the top of the picture.

(b) HORizontal LINearity (L4)

(1) The horizontal linearity coil (L4) is located in the lower left hand corner.

3. WIDTH Control (L6)

(a) The width control (L6) is located on the high voltage mounting plate and is accessible from the right side when the canopy is removed. It is used in conjunction with the horizontal width control on the front panel to adjust the horizontal picture width.

5-02 Adjustment Procedures

1. General

(a) Connect a test signal from a monoscope or pattern generator to one of the video input connectors on the rear of the monitor cabinet. If a monoscope or pattern generator is not available use a camera signal focused on a screen containing a reasonable amount of fine detail. Terminate the other video input connector with a 75 ohm video termination plug. The switch should be in the "C" position.

2. Contrast (R58), Brightness (R59) and Focus (R65)

(a) Adjust the contrast control and mid position and the brightness control almost fully clockwise. Adjust the ion trap by sliding it back and forth, and rotating it on the neck of the picture tube until the brightest picture is obtained. Turn the contrast control fully counterclockwise. Adjust the brightness control several degrees beyond the point where the raster is just extinguished. Turn up the contrast control to obtain a moderately bright picture. Readjust the brightness control slightly until the beam is extinguished in the darkest parts of the picture. Readjust the contrast control (maintaining normal contrast picture) so that the left portion of the picture has just started to change linearity and contracts to the right.

(b) Simultaneously adjust the focus control on the front of the cabinet and readjust the ion trap for optimum focus. This is done by observing the sharpness of the resolution lines in the test pattern and eliminating any smearing into the black circles of the test pattern. The optimum focus should be at an ion trap position which produces maximum screen brightness.

(c) Ensure that the yoke is as far forward as possible on the picture tube neck. Adjust the centering magnets at the rear of the yoke, and the vertical size and width coils until a well centered picture just fills the screen. The front panel width control should be set to produce its maximum width. If neck shadow appears in the corner(s) of the picture tube, recheck the yoke position and/or readjust the centering magnets and the ion trap to eliminate the shadow. If the latter two adjustments are necessary, the brightness and focus procedures should be repeated.

(d) Contrast and brightness control settings may have to be readjusted slightly after making the adjustments in (b). Ion trap adjustment also necessitates centering readjustment.

3. Vertical Height (R61) and Linearity (R62)

(a) Turn on the sync generator grating pattern or equivalent. Adjust the vertical linearity and vertical height controls until the picture vertically fills the screen and there is uniform spacing between all the horizontal grating lines. Adjustment of the vertical linearity control will normally require some readjustment of the vertical height control.

4. Horizontal Linearity (L4)

(a) Adjust the horizontal linearity control located on the back chassis for uniform spacing between the vertical grating lines. When the width control and coil are adjusted to produce the smallest picture, the spacing between the vertical bars should still be uniform.

5. AFC Transformer (T4)

(a) Ensure that the core of the AFC transformer located on the high voltage chassis is screwed in such that the core is full into the winding. Check to see that the core is staked at this position.

6. Horizontal Multivibrator

(a) If the horizontal multivibrator is not set to free-run at 15.75 KC the following procedure should be followed.

(b) Short out the sync stabilizer coil, L5, and short the grid of V3 (pin 8) to ground. Adjust the horizontal hold control until the picture stops drifting horizontally.

(c) Remove the short from L5 and adjust it until the picture again stops drifting horizontally. The multivibrator is now free-running at 15.75 KC. Remove the short from V3 (pin 8). During the adjustment the picture may roll vertically.

7. Pincushion Magnet

(a) With the monitor operating on composite signal obtain a normal picture on the screen as in Section 5-02.2 (a). Turn on the sync generator grating bars (or equivalent).

(b) Loosen the clamping screw of the yoke ring and adjust the position of the magnets up, down or sideways by sliding the brackets under the yoke ring or bending the brackets as required to eliminate the pincushion effect.

(c) Clamp the magnets in position by tightening the clamping screw of the yoke ring. When the yoke ring is in position the clamping screw should be about 45 degrees to the left of the top of the yoke.

5-03 Non Standard Sync

1. The unit has been set up to receive standard ElA sync in the composite mode.

2. If non standard sync is used in the composite mode, vertical instability may be exhibited.

3. To overcome this condition, trimmer (C39) should be adjusted.

CHAPTER 6

MAINTENANCE

6-01 Adjustments

1. Connect a test signal from a monoscope or pattern generator to one of the video input connectors on the rear of the monitor cabinet. If a monoscope or pattern generator is not available use a camera signal focused on a scene containing a reasonable amount of fine detail. Terminate the other video input connector with a 75 ohm video termination plug. Switch should be in "C" (comp.) position.

2. If the signal to be used for test purposes is composite set the sync selector switch to comp. side position. Using a non-composite signal a synchronizing signal will have to be supplied to one sync input and the other terminated with a 75 ohm termination plug. Switch to non-composite position.

3. Connect the monitor to 117 volts, 60 cps.

4. Adjust contrast control to min position and the brightness control almost fully clockwise. Adjust the ion trap by sliding it back and forth and rotating it on the neck of the picture tube until the brightest picture is obtained. Turn contrast control fully off and adjust brightness control several degrees beyond the point where the raster is just extinguished. Turn up the contrast control to obtain a moderately bright picture and readjust the brightness control slightly until the beam is extinguished in the darkest parts of the picture. Re-adjust the contrast control (maintaining normal contrast picture) so that the left portion of the picture has just started to change linearity and contracts to the right.

5. Simultaneously adjust focus control on front of cabinet and readjust ion trap for optimum focus. This is done by observing sharpness of resolution lines in test pattern and eliminating any smearing into black circles of test pattern. The optimum focus should be at an ion trap position producing maximum screen brightness.

6. Ensure that the yoke is as far forward as possible on picture tube neck. Adjust the centering magnets at the rear of the yoke, and the vertical size and width coil until a well-centered picture just fills the screen.

7. The front panel width control should be set to produce its maximum width. If neck shadow appears in corner(s) of the picture tube readjust yoke position and/or readjust centering magnets and ion trap to eliminate it. If the latter two adjustments are necessary, the brightness and focus procedures should be repeated.

Contrast and brightness control settings may have to be re-adjusted slightly after making the other adjustments outlined above. Ion trap adjustment also necessitates centering readjustments.

8. Turn on the sync. generator grating pattern or equivalent and adjust the vertical linearity and vertical height controls until the picture vertically fills the screen and there is uniform spacing between all the horizontal grating lines. Adjustment of the vertical linearity control will usually require some readjustment of the vertical height control.

9. Adjust the horizontal linearity control located on the rear chassis such that there is a uniformity of spacing between the vertical grating lines. After the width control and drive are adjusted to produce the smallest picture, the variation in spacing between vertical bars should still be uniformly spaced.

10. Ensure that the core of the AFC transformer located on the high voltage chassis is screwed in such that the core is full into the winding. Check to see that the core is staked at this position.

11. The horizontal multivibrator must be preset to free-run at 15.75 KC. To do this, short out the sync stabiliser coil, L5, and short the grid of V3 (pin 8) to ground. Adjust the horizontal hold control until the picture stops drifting horizontally. Remove the short from L5 and adjust it until the picture again stops drifting horizontally. The multivibrator is now running free at 15.75 KC. Remove the short from V3 (pin 8,.

NOTE: During the adjustment the picture may roll vertically.

6-02 Pincushion Magnet Adjustment

1. With the monitor operating on composite signal, obtain a normal picture on the screen as in the first part of 6-01.4. Turn on the sync generator grating bars (or equivalent).

2. Loosen the clamping screw of the yoke ring and adjust the position of the magnets up, down or sideways by sliding the brackets under the yoke ring or bending the brackets as required to eliminate the pincushion effect.

3. Clamp the magnets in position by tightening the clamping screw of the yoke ring. When the yoke ring is in position the clamping screw should be about 45 degrees to the left of the top of the yoke.

6-03 Cleaning and/or Replacement of C.R.T.

1. Cleaning

(a) To clean the safety glass and CRT face remove the four screws in the corners of the front plate. Remove plate and clean. When cleaning CRT be very careful not to scratch the face.

2. Replacement

(a) NOTE: Standard Safety Procedures should be used when handling Cathode Ray Tube (CRT).

(b) Disconnect A.C. cord, CRT socket, ion trap and high voltage lead from CRT, then discharge CRT by shorting the high voltage connector to ground or outer aquadag.

(c) Remove the tubes on the two vertical chassis which may interfere with the removal of the CRT. Loosen the clamp that secures the deflection yoke and the centering magnets.

(d) Remove the CRT simultaneously as the deflection yoke is slid off the neck of the CRT taking care that the yoke wires do not receive excessive tension. Place the CRT in a safe place (preferably an empty CRT carton).

(e) Insert the new tube in the reverse order.

6-04 Trouble Shooting Reference Information.

1. Check that pulse waveforms from synchronizing generators are properly formed and within the limits set forth in RMA specification RS-170. Improper pulse waveforms can cause synchronizing troubles in the monitor and pairing.

6-05 D.C. Voltage Table

1. Unless otherwise specified the voltages in normal units may vary by as much as 15% from those given.

2. The voltages in Table 6-01.1 were obtained under the following conditions:-

(a) A.C. voltage 117 volts, 60 cps.
(b) Full screen size picture.
(c) No video signal, but with synchronizing signal or composite video signal fed into the sync input and the signal selector switch set in NC position.
(d) Contrast control turned fully down.
(e) Brightness control set to just extinguish the raster.
(f) Horizontal hold control set as in 6-01.11.

TABLE 6-01.1

	PIN NUMBERS									
TUBE	1	2	3	4	5	6	7	8	9	10
V1 6DJ8	114	(1)* -2.55				63	11.1*	11.4		
V2 6DX8	10.3*	134	11.9			168		-3.25*	135	
V3 6DX8	-1.75*	135				29		-28*	28.4	
V4 6CM7	395		18*			66*	-3.3*	.05*	18.5	
V5 12AU7A	201*	(3) .85	8.2			148*	-8.9*	8.2		
V6 6GB5		-28					137	4.8	150 (2)	
V7 6AL3	460						460		237	
V8 1X2B		CORONA SHIELD				9.2 to 10 KV **				
V9 8DP4		.25*	(4) 350							(5)* 238

All measurements in the table are between the designated tube pin and ground unless otherwise specified.

Measurements made with a 20,000 ohm/volt meter.

* Measured with a V.T.V.M.

** Measured with a V.T.V.M. with high voltage probe.

(1) Grid bias depends on sync signal amplitude.

(2) If power source voltage is 117 volts, and power transformer primary is correctly connected, this should be within ±5%.

(3) May vary by ±40%.

(4) This depends on the setting of the focus control.

(5) To be measured with a V.T.V.M. high impedance, high voltage probe.

CHAPTER 7

ACCESSORIES

7-01 Tally Light and Remote Sync Switching

1. Physical space has been allotted, and the necessary holes have been provided for the insertion of a Cannon receptacle (J6), plug (P6) and relay (K1). This enables the pilot light to be used as a tally light and/or the signal to the sync amplifier can be remotely switched from composite to non composite sync.

2. The connections for remote switching of the sync and using the pilot light as a tally light are shown on the Schematic, Fig. 9-01.1.

7-02 R20590 Rack Mounting Kit

1. This kit supplies the parts necessary to rack mount two R20500A 8" T.V. Monitors side by side in any standard 19" rack.

CHAPTER 8

PARTS LIST

8-01 General

1. The following parts, shown in Table 8-01.1, are used in the R20500B Television Monitor and are part of it. All components with supplier other than Northern Electric can usually be obtained from any reliable electrical jobber.

2. All resistors are composition and 10% tolerance unless otherwise stated.

3. See Figure 9-01.1 for circuit references.

TABLE 8-01.1

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
C1	Capacitor, Mylar, 0.15 mfd, 400 V.D.C.	V161	Aerovox
C2	Capacitor, Mylar, 0.15 mfd, 400 V.D.C.	V161	Aerovox
C3	Capacitor, Metalized Paper, 1.0 mfd, 200 V.D.C.	P92ZN	Aerovox
C4	Capacitor, Mylar, 0.10 mfd, 400 VDC	V161	Aerovox
C5	Capacitor, Metalized Paper, 0.02 mfd, 600 V.D.C.	P92ZN	Aerovox
C6	Capacitor, Mylar, 0.10 mfd, 400 V.D.C.	V161	Aerovox
C7	Capacitor, Electrolytic, 10/10/10/10 mfd, 450 V.D.C.	AFH4-10	Aerovox
C8	Capacitor, Mylar, 0.10 mfd, 400 V.D.C.	V161	Aerovox
C9	Capacitor, Mylar, 0.10 mfd, 400 V.D.C.	V161	Aerovox
C10	Capacitor, Mylar, 0.10 mfd, 400 V.D.C.	V161	Aerovox
C11	Capacitor, Mylar, 0.0022 mfd, 600 V.D.C.	V161	Aerovox
C12	Capacitor, Mylar, 0.0022 mfd, 600 V.D.C.	V161	Aerovox

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
C13	Capacitor, Mylar, 0.0022 mfd, 600 V.D.C.	V161	Aerovox
C16	Capacitor, Mylar, 0.047 mfd, 600 V.D.C.	V161	Aerovox
C17	Capacitor, Disc 1000 mmfd, 1.5K V.D.C.	HVD-15	Aerovox
C18	Capacitor, Mylar, 0.047 mfd, 600 V.D.C.	V161	Aerovox
C19	Capacitor, Mylar, 0.033 mfd, 600 V.D.C.	V161	Aerovox
C20	Capacitor, Mylar, 0.047 mfd, 600 V.D.C.	V161	Aerovox
C21	Capacitor, Mica, 75 mmfd, 500 V.D.C. 5%	1469	Aerovox
C22	Capacitor, Mylar, 0.0047 mfd, 200 V.D.C.	V161	Aerovox
C23	Capacitor, Mylar, 0.047 mfd, 200 V.D.C.	V161	Aerovox
C24	Capacitor, Mica 3900 mmfd, 500 V.D.C. 10%	CH30	Aerovox
C25	Capacitor, Mica, 560 mmfd, 500 V.D.C. 5%	1469	Aerovox
C26	Capacitor, Mylar, 0.0047 mfd, 600 V.D.C.	V161	Aerovox
C27	Capacitor, Mica, 330 mmfd, 500 V.D.C. 5%	1469	Aerovox
C28	Capacitor, Mylar, 0.01 mfd, 200 V.D.C.	V161	Aerovox
C29	Capacitor, Mylar, 0.047 mfd, 600 V.D.C.	V161	Aerovox
C30	Capacitor, Mylar, 0.047 mfd, 600 V.D.C.	V161	Aerovox
C31	Capacitor, Mylar, 0.047 mfd, 600 V.D.C. 10%	V161	Aerovox
C33	Capacitor, Hi-K Ceramic 500 mmfd, 20K V.D.C.	TV-20	Centralab

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
C34	Capacitor, Electrolytic, 80/80 mfd, 450 V.D.C.	BO-356	Cornell Dubilier
C35	Capacitor, Electrolytic, 100 mfd, 12.5 V.D.C.	AC-57	Rogers Majestic
C36	Capacitor, Electrolytic, 20/80/50/100 mfd, 450/350/350/50 V.D.C.	DO-764	Cornell Dubilier
C37	Capacitor, Mylar, 0.15 mfd, 400 V.D.C.	V161	Aerovox
C38	Capacitor, Ceramic, 22 mmfd, 3 KV	HD3-22	Erie Resistor Co.
C39	Capacitor, Trimmer, 0.0014 - 0.003 mfd.	315	Elmenco
C40	Capacitor, Mica, 560 mmfd, 500 V.D.C. 5%	1469	Aerovox
C41	Capacitor, Tubular, 0.1 mfd, 600 V.D.C.	6TMF1	Sprague
L1	Coil, peaking, 93 uh	6177	Miller
L2	Coil, peaking, 60 uh	6110	Miller
L3	Coil, peaking, 60 uh	6110	Miller
L4	Coil, Linearity, 1.0-7.0 mh	R20500-59	Northern Elec.
L5	Coil, Sync Stabilizing	6210-TV	Miller
L6	Coil, Width, .53-3.8 mh	R20500-92	Northern Elec.
Y1	Yoke Deflection	R20500-56	Northern Elec.
CR1	Diode, Silicon Rectifier	1N547	
CR2	Diode, Silicon Rectifier	1N547	
CR3	Diode	1N478	
CR4	Diode, Dual	D-5	I.R.C.
CR5	Diode	1N478	
R1	Resistor, W/W, 18 ohms 5W, 10%	X-60	Tru Ohm
R2	Resistor, W/W, 10 ohms 5 W, 10%	X-60	Tru Ohm

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
R3	Resistor, 8200 ohm, 1/2 W.	EB	Allen Bradley or equivalent
R4	Resistor, 8200 ohm, 1/2 W.	EB	Allen Bradley or equivalent
R5	Resistor, 10K, 1/2 W.	EB	Allen Bradley or equivalent
R6	Resistor, 22K, 1/2 W.	EB	Allen Bradley or equivalent
R7	Resistor, Metal Clad, Power 300 ohm, 25 W.	M25W300-3	Sage Electronics
R8	Resistor, 470K, 1/2 W.	EB	Allen Bradley or equivalent
R9	Resistor, 2200 ohm, 2 W.	HB	Allen Bradley or equivalent
R10	Resistor, 6800 ohm, 2 W.	HB	Allen Bradley or equivalent
R11	Resistor, 470K, 1/2 W.	EB	Allen Bradley or equivalent
R12	Resistor, 27K, 2 W.	HB	Allen Bradley or equivalent
R13	Resistor, 27K, 2 W.	HB	Allen Bradley or equivalent
R14	Resistor, 220K, 1/2 W.	EB	Allen Bradley or equivalent
R15	Resistor, 15K, 1 W.	GB	Allen Bradley or equivalent
R16	Resistor, 2200 ohm, 2 W.	HB	Allen Bradley or equivalent
R17	Resistor, 470K, 1/2 W.	EB	Allen Bradley or equivalent
R18	Resistor, 220K, 1/2 W.	EB	Allen Bradley or equivalent
R19	Resistor, 12K, 1/2 W.	EB	Allen Bradley or equivalent
R20	Resistor, 22M, 1/2 W.	EB	Allen Bradley or equivalent

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
R21	Resistor, 4.7K, 1/2 W.	EB	Allen Bradley or equivalent
R22	Resistor, 27K, 1/2 W.	EB	Allen Bradley or equivalent
R23	Resistor, 470K, 1/2 W.	EB	Allen Bradley or equivalent
R24	Resistor, 15K, 2 W.	HB	Allen Bradley or equivalent
R25	Resistor, 1M, 1/2 W.	EB	Allen Bradley or equivalent
R26	Resistor, 5600 ohm, 1/2 W.	EB	Allen Bradley or equivalent
R27	Resistor, 33K, 2 W.	HB	Allen Bradley or equivalent
R28	Resistor, 220K, 1/2 W.	EB	Allen Bradley or equivalent
R29	Resistor, 470K, 1/2 W.	EB	Allen Bradley or equivalent
R30	Resistor, 1800 ohm, 1/2 W. 5%	EB	Allen Bradley or equivalent
R31	Resistor, 10K, 2 W.	HB	Allen Bradley or equivalent
R32	Resistor, 4700 ohms, 1/2 W. 5%	EB	Allen Bradley or equivalent
R33	Resistor, 100K, 1/2 W. 5%	EB	Allen Bradley or equivalent
R34	Resistor, 100K, 1/2 W. 5%	EB	Allen Bradley or equivalent
R37	Resistor, 220K, 1/2 W.	EB	Allen Bradley or equivalent
R38	Resistor, 470K, 1/2 W.	EB	Allen Bradley or equivalent
R39	Resistor, 100K, 1/2 W.	EB	Allen Bradley or equivalent
R40	Resistor, 3.9M, 1/2 W.	EB	Allen Bradley or equivalent

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
R41	Resistor, 1.2K, 1/2 W.	EB	Allen Bradley
R42	Resistor, 2.2M, 1/2 W.	EB	Allen Bradley
R43	Resistor, 470 ohm, 1/2 W.	EB	Allen Bradley
R44	Resistor, 4.7M, 1/2 W.	EB	Allen Bradley
R45	Resistor, 470K, 1/2 W.	EB	Allen Bradley
R46	Resistor, 1500 ohm, 1/2 W.	EB	Allen Bradley
R47	Resistor, 6800 ohm, 1 W.	GB	Allen Bradley
R48	Resistor, 68K, 1/2 W.	EB	Allen Bradley
R49	Resistor, 120K, 1/2 W.	EB	Allen Bradley
R50	Resistor, 8.2K, 1/2 W.	EB	Allen Bradley
R51	Resistor, 1M, 1/2 W.	EB	Allen Bradley
R52	Resistor, 56 ohm, 2 W.	HB	Allen Bradley
R53	Resistor, 18K, 2 W.	HB	Allen Bradley
R54	Resistor, 100 ohm, 1/2 W.	EB	Allen Bradley
R55	Resistor, 2200 ohm, 2 W.	HB	Allen Bradley
R56	Resistor, 18 ohm, 1 W.	GB	Allen Bradley
R57	Resistor, 1000 ohms, 1/2 W.	EB	Allen Bradley
R58	Potentiometer, 1K, 2 W. State spindle length.	JS	Allen Bradley
R59	Potentiometer, 50K, 1/2 W. State spindle length.	U35	Allen Bradley
R60	Potentiometer, 200K, 1/2 W. Screwdriver adjust.	U43	Allen Bradley
R61	Potentiometer, 2.5M, 1/2 W. Screwdriver adjust.	U255	Allen Bradley
R62	Potentiometer, 2500 ohms, 2 W. Screwdriver adjust.	J	Allen Bradley
R63	Potentiometer, 50K, 1/2 W. Screwdriver adjust.	U35	Allen Bradley

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
R64	Potentiometer, 10K, 1/2 W. Screwdriver adjust.	U20	Allen Bradley
R65	Potentiometer, 2M, 1/2 W. Screwdriver adjust.	U56	Allen Bradley
R66	Resistor, Wire Wound 1 ohm, 1/2 W.	RU3	International Resistance Co.
R68	Resistor, 100 ohms, 1/2 W.	EB	Allen Bradley
R69	Resistor, 33K, 1/2 W.	EB	Allen Bradley
R70	Resistor, 8200 ohm, 1/2 W.	EB	Allen Bradley
R71	Resistor, 5600 ohm, 1/2 W.	EB	Allen Bradley
T1	Transformer, Power	R20525B	Northern Elec.
T2	Transformer, Vertical Output	V309	Ram
T3	Transformer, Horizontal Output	R20500-28	Northern Elec.
T4	Transformer, AFC	R20500-58	Northern Elec.
V1	Tube	6DJ8	
V2	Tube	6DX8	
V3	Tube	6DX8	
V4	Tube	6CM7	
V5	Tube	12AU7A	
V6	Tube	6GB5	
V7	Tube	6AL3	
V8	Tube	1X2B	
V9	Picture Tube	8DP4	

CIRCUIT SYMBOL	DESCRIPTION	TYPE	SUPPLIER
N1	Vertical Intergrator	PC101	Centralab
F1	Fuse, 1.5A, 125V. "Slo-Blo"	3AG	
F2	Fuse, 0.25A, 250V. "Slo-Blo"	3AG	

Remote Tally Light and Sync Switching

K1	Relay S.P.D.T.	MS1032	Potter and Brumfield
J6	Socket	XLR-4-14	Cannon
P6	Plug	XLR-4-11C	Cannon